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ABSTRACT

There are many reasons for teachers' resistance to innovation in the classroom through computer use. This resistance can be categorized into one of several broad-based themes: resistance to organizational change; resistance to outside intervention; time management problems; lack of support from the administration; teachers' perceptions; or personal and psychological factors. Ronald Havelock (1973) has recognized that innovations, regardless of degree, run the risk of being resisted or rejected in the school environment. He suggests that change agents become aware of the six phases that teachers must go through prior to acceptance: awareness, interest, evaluation, trial, adoption, and integration. In response to problems that may arise in this linear model for the implementation of change, the six steps can be broken down into three phases: involvement, investment, and incorporation, all of which are explored in detail. These phases support a process whereby attention can be paid concurrently to one or more steps instead of one large cycle of single linear steps. It is important to understand what is going on in each of these steps, not only in terms of what they suggest, but also in terms of what is being observed in the school system today. It is concluded that perhaps it is time to restructure the entire learning process and try to solve today's educational problems by changing the teacher's role, accepting a new philosophy towards pedagogy, adopting the tools available today, and making thoughtful decisions about the appropriate use of technology in the classroom. Two figures illustrate the models of integration of change. (Contains 15 references.) (MAS)

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A Transitional Model for the Introduction of Technology

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Steven Terrell

A Transitional Model for the Introduction of Technology

It seems that those of us who consider ourselves computer literate, if such a thing exists, think everything is just fine. We regularly use our computers in our classrooms and, in fact, we not only use them, we integrate them into our curriculum. Our students not only understand and use technology, they apply what they know to help them do a better job in other subject areas. Unfortunately, when we look around and see the multitude of other teachers using technology, we get the feeling we may be alone.

Perhaps you already know this. You've seen the empty computer labs in many of our schools or the one or two computers sitting, collecting dust, in the back of many classrooms. "Why does this happen?" we ask. "If I can creatively and effectively use computers in my classroom, why can't all the other teachers? After all, the school systems encourage us to use technology with technology grants, in-service training and payment for college tuition. Where are our peers going wrong?"

Upon reviewing the related literature, it seems that many researchers have noted similar resistance to innovation in both the educational and non-educational arenas. This resistance can be categorized into one of several broad-based themes (Poole, 1991).

Organizational Change

The first of these topics is a general resistance to change that appears within many organizations including educational institutions. Mintzberg and Quinn (1991) state that it is almost always necessary to overcome opposition when implementing change in an organization. Lipson (1981) concurred by noting that organizations will reject methods and tools that they do not find compatible to the organizational structure. In addressing education specifically, he further states that teachers, while many times dissatisfied with the support they are getting, will fight any organizational innovation that, in their perception, drains resources from activities that are traditional within the classroom.

Outside Intervention

A second general theme running through the literature is one of resistance to outside intervention. In other words, teachers want to be in charge of their personal classroom and apparently do not respond well to innovations coming from sources outside of their workplace that may threaten these feelings of control. Butt (1982) wrote that one of the major reasons for the failure of classroom innovation was that outsiders attempting to implement such innovations are ignorant of classroom reality, as well as the classroom teacher's perspective of such changes. This, he feels, results in changes that are inappropriate, difficult to implement and too idealistic for the everyday classroom. In many instances the teachers, denied a feeling of ownership and participation, lack

the personal commitment necessary to make the innovations successful. This opinion, supported by Zaltman, Florio and Sikorski (1977), indicates that innovations developed outside of the group of persons that is expected to implement the changes may stand to be rejected. This can be attributed, in many instances, to the teacher's failure to perceive that a problem exists, thereby leading to disagreement with the persons implementing the change as to the cause of or proposed solution to the problem.

Time Management

A third general area of resistance to innovation is the teacher's feeling that the changes are impinging on an already over-crowded workday. Hall (1991) noted that administrators and others working in the educational arena must realize that anything added to the teacher's daily agenda causes a resultant overload in the system. This, he states, not only causes the innovation to fail, but subsequently, brings a whole new series of problems, such as teacher burnout, to light. Barth (1990) also addresses this issue by stating that many teachers find it difficult to be effective while attempting to fulfill all of the non-teaching demands placed on them.

The Administration

Although many people feel that administrations are always willing to support the introduction of technology into the educational environment, this is not necessarily the case. As Morris Massey, the noted lecturer, points out, we have to be aware of a given administrators value system. If he or she is intimidated by the technology or doesn't prescribe to technology in their educational philosophy, this perceived non-support will affect those persons working for them.

As noted by Poole (1991), there is a tendency to blame teachers for the failure of classroom innovation in many cases. Huberman and Miles (1984) state that the lack of commitment and support will many times cause the project to fail. Successful implementation, they feel, depends on the administration's ability to apply pressure to the faculty as well as to guard against any potential resistance.

Teacher's Perceptions

Poole (1991) described resistance which can be caused by the teacher's perception of the attributes or usefulness of the innovation to the faculty members attempting to implement the change. During interviews following the experimental period, one teacher commented that the graph was just one more piece of paper that had to be sent home to each child's parents on a weekly basis. By stating this, the teacher was relegating the graph to the level of the memos, etc. that are regularly sent home with the students. Rogers (1983) states that if there is a low perceived advantage to the innovation, that is, there is no apparent advantage evident in its' adoption, then the implementation of the innovation is likely

to fail. In a similar vein, Levine (1980) notes that if the innovation is not compatible with the user's beliefs and/or past experiences, the likelihood of success is diminished.

Many teachers may not understand the nature of the problem that the innovation is supposed to address. This leads to uncertainty as to what actions on the part of the teachers are required (Terrell (1992); Zaltman and Duncan (1977); Zaltman, Florio and Sikorski (1977)).

Personal and Psychological Factors

The last general theme occurring in the literature is that of the "personality and psychological factors" (Poole, 1991, p. 2) of the faculty members being asked to implement the changes.

Bushnell and Rappaport (1971) have stated that the general attitude of the faculty being asked to implement innovations as well as their tolerance for ambiguity are major barriers to bringing change into the classroom. Zaltman and Duncan (1977) indicate that faculty members may not be willing to accept the risk involved with new projects or relate the outcomes of previously unsuccessful innovations in the past to their perceptions of what the new project will bring.

A Model for Implementation of Innovations

As has been noted, there are many reasons that innovation in the class might fail and these problems have been addressed from many perspectives. Ronald Havelock (1973), has recognized that innovations, regardless of degree, run the risk of being resisted or rejected in the school environment. He suggests that change agents become aware of the six phases (Figure 1) that teachers must go through prior to successfully adopting an innovation as well as the actions that must be taken by change agents during these phases in order to ensure a smooth acceptance of innovation. These steps include awareness, interest, evaluation, trial, adoption and integration.

The first step, awareness, is when teachers being asked to implement the changes are exposed to the innovation and develop a passive interest in the project. It is important to note that this is a very critical stage in that "the way in which the innovation is presented to him at the beginning may well determine whether or not he is motivated enough to move on to the second and subsequent stages" (p. 113).

Developing the teachers interest in the project is the second step of the process. In this stage it is important that the change agent promote the project as well as inform the user of the innovation of the viability of the innovation for their given situation. It is during this time that the teachers develop their first feelings, either positive or negative, toward the innovation. These feelings will either influence the teacher to accept or resist the project.

The third stage that teachers go through is evaluation. It is during this time that the teachers make the connection between their given situation and the proposed innovation. During

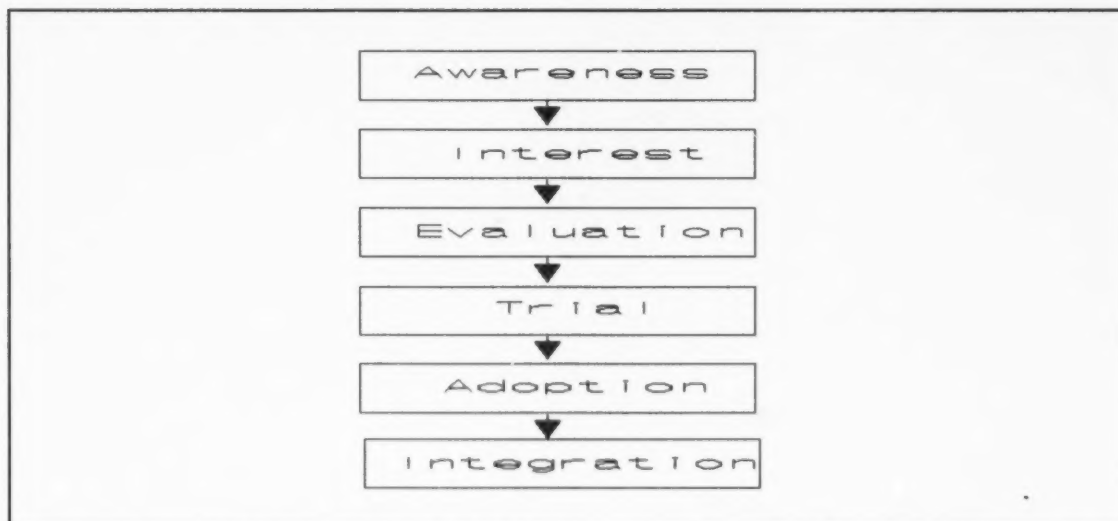


Figure 1 - Havelock's Model for the Implementation of Change

this phase of the adoption process, the change agent should again be supplying the teacher with information concerning the viability of the project as well as demonstrating specific instances where the innovation could be used in the classroom environment. After a "mental trial" period, the individual decides whether or not the innovation is worth their time.

After the evaluation stage, teachers should be asked to use the innovation on a small scale with the change agent providing both demonstrations and training. This temporary or probationary period allows the teacher ample opportunity to find out if the innovation will work in their given situation.

Adoption or rejection occurs after the trial period. The change agent should work with the classroom teacher offering whatever help or services are required. A successful trial will lead to integration of the innovation into the classroom. Havelock warns however that:

True adoption cannot be considered to have taken place unless use of the innovation becomes routine. It must be integrated into the day-to-day working life of the teacher, or the administrator, or the user, whoever he may be. (p. 114)

The Three I's

Many persons will look at the Havelock model and view it as an wholly linear process. Unfortunately, examples from the business world have shown that prescribing to a purely linear model in order to implement technology often leads to problems concerning systems quality. Many systems development methodologists have recognized this and have worked on creating a more end-user intensive,

iterative process to use when implementing computing technology. With this in mind, by looking closely at the Havelock model, the six steps can actually be broken down into three phases (Figure 2). These three phases; Involvement, Investment and Incorporation; support a process whereby attention can be paid concurrently to one or more steps instead of one large cycle of single linear steps. For example, there may be instances during the integration step that require verification using evaluation procedures. Various instances of sub-cycles can occur to meet specific requirements. Another example would see teachers at a given school, some already at the incorporation stage, providing support and answering questions for other teachers just entering the involvement stage. It is important that we understand what is going on in each of these phases, not only in terms of what they suggest, but also in terms of what is being observed in the school system today.

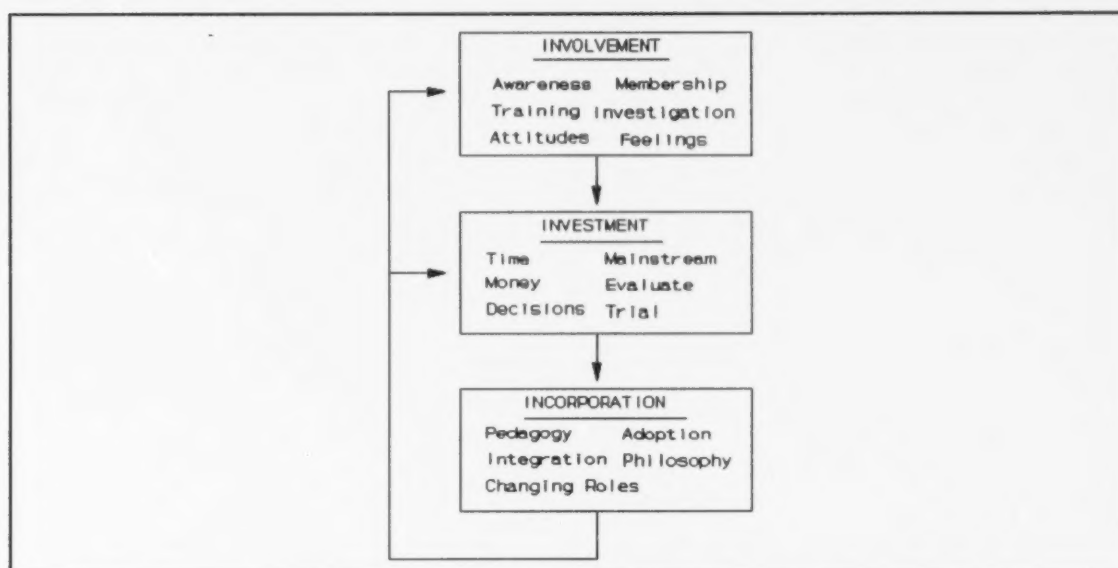


Figure 2 - The Three I's of Technology Integration

The Involvement Phase

The involvement phase involves ideas such as awareness, membership, training, attitudes, feelings and investigation. In the involvement phase, we are asking the persons entering into technological change, be it desired or mandated, to get involved with the process. This may mean many things for many people. Persons that are technophobic or simply have never used technology may, as part of this phase, attend training classes or work with their peers to become more familiar with technology and its applications. Others, perhaps more comfortable with computing technology, may investigate other scenarios where technology has been successfully used in the manner in which it is proposed for their location. These are the persons that can actually work to help design a technological solution for a specific location and

problem.

During this phase, several things must be seriously considered. First, it must be noted that this stage is "mental" in nature. By this we mean that changes that occur in this stage cannot, for the most part, be seen. What is changing is a person's knowledge, attitudes and feelings about technology and its uses. Unless users of technology feel comfortable with both its operation and application, they may never leave this stage or, at best, leave it with such consternation that the Investment and Incorporation stages are doomed before they start. Lastly, the earlier persons adopting the technology can feel as "part of the team" the better your chances for successful integration. Pride of ownership goes a long way in ensuring the cooperation and dedication of those persons involved in the project.

The Investment Phase

The investment phase focuses on ideas such as evaluation, decision-making and evaluation. A person or institution entering this phase is ready to make an investment of both time and money. They have bought into the idea that technology is right for a given situation and they are now ready, at least on a limited scale, to start actually using this technology. They may have decided to improve their classroom management via a computer-managed instructional system (CMI) or use computer-assisted instruction (CAI) to help students in a given subject area. Whatever the intended use, a word of caution is in order.

In far too many instances, this initial investment in technology is made peripheral to, rather than as an integral part of the curriculum. Persons adopting technology should be made aware of the "we want a computer in every classroom" phenomena and be warned to stay away from it. Why? A computer in every classroom is exactly that, a physical piece of machinery, often never used, located in a given teacher's work area. In adopting computer-assisted technology, we want to make sure that students use the technology as part of the mainstream curriculum, not just as a reward, an outside reference or for special projects. If students are to understand and use the technology, it is important that they be able to experience how they can use it to help them do classwork better and more efficiently. In the case of teachers, if they are to adopt computer-managed instruction, we want the teacher to realize that his or her job is made easier by the technology and that the technology is just not "something else to do" on top of all of the other daily activities. Dringus (1995) warns, however, that it is not always necessary or desirable for faculty or students to use the entire range of existing or new technological tools just because they are available. Decisions need to be made as to what tasks are to be accomplished, what tools will best assist in accomplishing tasks and the time frame during which the tasks are to be completed. In any event, perhaps an analogy can be drawn by imagining the operation of a business where secretaries can only use the micro-computer when creating invitations to the office Christmas party, all other correspondence being created

using an old manual typewriter. There is not much effort to encourage the advocacy or use of the newer, better technology. We would be reinforcing the erroneous idea that, even though it's new and supposedly improved, we can get along without it. We must demonstrate to students and teachers alike that these tools are here, they do work and they can make your job easier.

Incorporation

If we've successfully made it through the involvement and investment stages, we're now ready to implement technology fully into the classroom. In doing this, we need to address ideas such as pedagogy, integration, adoption and philosophy. Many persons might ask why this total integration is so important, couldn't the school system continue to operate much as it already does without this insistence that we adopt technology? The answer again lies in looking at what has occurred in other arenas during the last half century. Dating back to 1945, technology has radically changed many professions. Physicians have seen the introduction of radically different tools and techniques, accountants use electronic instead of paper ledgers and architects are able to totally redesign a building in only a few minutes, all thanks to the advent of technology. Bring a school teacher forward from 1945, however, and they, in a typical classroom, wouldn't see very many differences. The primary teaching methodology, despite all of the changes in our society, remains one teacher lecturing to a room full of children. Technology allows us to break this mold in order to allow our teachers to use their human expertise where it is most needed. Computers can be used to teach rote subjects such as math and reading, freeing teachers to work with students with different learning styles or other types of pedagogical problems. Many of the problems we are facing today, including dropping test scores, higher drop-out rates, more incidences of truancy and an inordinate number of illiterate adults are not going to be solved using the same old tools and techniques, year in and year out. Perhaps it is time we restructured the entire process and tried to solve these issues by changing our roles as teachers, by accepting a new philosophy towards pedagogy, by adopting the tools we have available today and by making thoughtful decisions about the appropriate use of technology in our classrooms.

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